



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,844	11/21/2001	Thomas Klingenbrunn	01P15526US	2700

7590 03/19/2008
Siemens Corporation
Attn: Elsa Keller, Legal Administrator
Intellectual Property Department
186 Wood Avenue South
Iselin, NJ 08830

EXAMINER

BOCURE, TESFALDET

ART UNIT	PAPER NUMBER
----------	--------------

2611

MAIL DATE	DELIVERY MODE
-----------	---------------

03/19/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/990,844	KLINGENBRUNN ET AL.	
	Examiner	Art Unit	
	Tesfaldet Bocure	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4, 11-14 and 16-21 is/are allowed.
- 6) ☐ Claim(s) 5 is/are rejected.
- 7) ☐ Claim(s) 6-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-14 and 16-21 are pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by Ushirokawa (US patent number 5,644,603, Of a record).
4. Ushirokawa teaches a reduced state sequence estimator comprising:
determining the value of a previous symbol from the sequence of symbols (see response from the channel estimates symbols in figures 5A and 5B); and generating reduced trellis (see Viterbi equalizer 103) by calculating only path metrics for states in which the previous symbol having response higher than predetermined power level shown in figures 5A and 5B.

Response to Amendment

In response to Applicant's argument regarding claim 5 that the prior art of record, Ushirokawa, does not teach:

Ushirokawa discloses a method in which certain symbols are not included into the sequence estimation. To this end, *Ushirokawa* suggests to use a power threshold level as shown in Figs. 5A and 5B. Thus, only a limited amount of symbols are used in the sequence estimation. However, this does not have any

effect on the number of metric calculations performed in a Viterbi equalizer. In fact, *Ushirokawa* shows an exemplary trellis and its metric calculations in Fig. 6 and 14. Each of the trellis is populated with all possible metric calculation. Contrary to this concept, independent Claim 5 includes the following limitations: *"determining the value of a previous symbol from the sequence of symbols; and generating said reduced trellis by calculating only path metrics for states in which the previous symbol has the determined value."*

Thus, this method generates a reduced trellis by omitting the calculation of certain path metrics. In other words, only path metrics are calculated for symbols that have a predefined value. The Examiner apparently interpreted the power of a transmitted symbol as the claimed limitation of *"the value of a previous symbol"*. Applicant respectfully disagrees with this comparison. The power value of a symbol is not used for setting or determining a state in a trellis. The value of a symbol as claimed in independent claim 5 is a symbol value and defines the state in a trellis. Thus, as shown in FIG 5A of the present application (similar to Fig. 6 of *Ushirokawa*), 8 states are possible, wherein each state is defined by the value of three symbols for example, state 1 has three symbols each having a value of "0" whereas state 8 has three symbols each having a value of "1". The transmission power of a symbol is hereby irrelevant. Hence, the transmission power cannot be used to select a state in a trellis because a state in a trellis is defined by the actual values of the symbols.

According to Claim 5, first a value of a previous symbol, for example of the first symbol in the group of three symbols, is determined. For example, as shown in Fig. 5B of the present application this symbol is assumed to have the value "0." Now, the method looks at all states in the trellis in which this symbol has the value "0" and only calculates path metrics for those states. This is shown in Fig. 5C.

The method proposed by *Ushirokawa* does not provide for such a reduction. *Ushirokawa* discloses to use a trellis with reduced states but not with reduced metric calculation. *Ushirokawa* teaches to completely ignore a previous symbol by not including it into a trellis at all. See, *Ushirokawa*, Fig. 14. Fig. 14 of *Ushirokawa* shows that the first symbol of a three symbol state has been ignored (ignored states are shown in parentheses), However, its value could have been, for example, "0" or "1" as shown in the trellis of Fig. 14. Hence, no reduction in the amount of metric calculations is either disclosed or suggested by *Ushirokawa*. *Ushirokawa* discloses merely to exclude certain symbols that do not meet a predefined power threshold from the sequence. Hence, *Ushirokawa* discloses a different system in which the number of states in a trellis are reduced in a different way. However, once the trellis has been determined, all path metrics must be calculated.

Examiner kindly disagree to Applicant's assertion indicated above. First, the claimed language "*determining the value of a previous symbol from the sequence of symbols; and generating said reduced trellis by calculating only path metrics for states in which the previous symbol has the determined value,*" is broad enough (specifically the determined value of previous symbol) to read on any deterministic criteria or values, included but not limited to the power value determined in the Ushirokawa's patent. Second, Examiner will to bring Applicant's attention to compare the claimed language and the corresponding figure 4 in the instant application to that of figures 5A and 5B of the prior art. From the comparison, the impulse response of each of the received symbols having below the threshold value are eliminated in defining the state metrics. The impulse response having their power level higher than the threshold are used in calculating the state matrix. Therefore, the selected symbols which are higher than the threshold value, claimed determined symbols, are using for defining the state metrics; and using only the determined value in the state metrics, rather than the entire symbols, will minimize the trellis as claimed. Therefore, the approach in minimizing the trellis in the instant application is by eliminating the symbols having power level less than the threshold as is the case in *Ushirokawa* patent.

Examiner gain kindly disagrees that that the approach of *Ushirokawa* discloses a different system in which the number of states in a trellis are reduced in a different way. As shown in the comparison between the instant application and that of *Ushirokawa*, comparison of figures 5A and 5B to that of the claimed subject matter reduces the number states.

Applicant's assertion that "once the trellis has been determined, all paths must be calculated," such assertion is moot because nowhere in the claim calls for such limitation.

Allowable Subject Matter

5. Claims 1-4, 11-14 and 16-21 are allowed.
6. Claims 6-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tesfaldet Bocure whose telephone number is (571) 272-3015. The examiner can normally be reached on Mon-Thur (8:00a-5:30p) & Mon.-Fri (8:00a-5:30p).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tefaldet Bocure/
Primary Examiner, Art Unit 2611

/T. B./
Primary Examiner, Art Unit 2611

<div>Application Number</div> <div></div>	Application/Control No.	Applicant(s)/Patent under Reexamination	
	09/990,844	KLINGENBRUNN ET AL.	
	Examiner	Art Unit	
	Tesfaldet Bocure	2611	